Amendments to the Specification:

Paragraph beginning on page 1, line 5

The present invention relates generally to data communications and more particularly relates to a facility transport system for transporting Time Division Multiplexing (TDM) bit stream data over asynchronous Ethernet networks using the Internet Protocol (IP).

Paragraph beginning on page 1, line 9

Currently, the number of data networks and the volume of traffic these networks carry are increasing at an ever ~~increasing~~ faster rate. The network devices making up these networks generally consist of specialized hardware designed to move data at very high speeds. Typical networks, such as Ethernet based networks, are mainly comprised of end stations, Ethernet hubs, switches, routers, bridges and gateways. ATM networks are constructed with similar network devices adapted to carry ATM traffic, e.g., ATM capable end stations, edge devices and ATM switches.

Paragraph beginning on page 3, line 13

A significant disadvantage is that traditionally, transmission products are expensive, particularly in terms of management and maintenance aspects. The main reason for the high costs of management and maintenance of transmission equipment is the ~~relatively high inflexibility~~ lack of flexibility of both the equipment and the topology. In addition, most transmission equipment is characterized by non-trivial configuration and maintenance procedures. This makes networks with large numbers of transmission equipment products difficult to install, configure and maintain requiring skilled crafts that are specially trained to operate and maintain the equipment.

Paragraph beginning on page 4, line 32

The cost to telecommunications companies for building and maintaining two separate networks for voice and data can be enormous. As is the case in most parts of the world, the demand for data services is increasing at a ~~huge~~ fast rate. This is largely due to the explosive growth of the Internet including the use of the web, email and file transfer. It is also due to more and more work being done electronically in the workplace rather than on paper with the resultant increase in business-to-business data traffic.

Paragraph beginning on page 5, line 4

The demand for voice traffic is also increasing as the number of users of personal communications devices increases. The number of users such devices which comprise, for example,

cellular telephones, beepers, etc. is increasing each year. In addition, many third world countries are beginning to modernize their aging communications infrastructures [[be]] by replacing outdated systems and/or installing new systems where none previously existed.

Paragraph beginning on page 5, line 9

Thus, there is a need for a solution that will enable the convergence of both voice and data networks into a single network. This would permit PTTs to provide [[to]] voice and data services at [[a]] greatly reduced cost. In addition, a combined network would allow PTTs to provide new services to end users.

Paragraph beginning on page 6, line 2

The present invention ~~provides~~ is a transport facility adapted to transport TDM bit streams using IP packets over an asynchronous Ethernet network. The TDM bit streams are received, buffered and encapsulated into Ethernet frames using the method of the present invention. Using the present invention, TDM streams such as E1, T1, E3, T3, etc. can be transported via Ethernet across an Ethernet cloud using existing transport facilities such as optical fiber.

Paragraph beginning on page 15, line 16

Thus, the CED of the present invention permits the replacement of legacy transmission equipment in current use today with IP/Ethernet equipment that provides the same functionality but at far less cost. The CED thus emulates traditional circuit based TDM transmission equipment, hence the term 'Circuit Emulation Device.' The CED thus enables the transmission of any type of data since the contents of the ~~contents of the~~ TDM bit stream are encapsulated and subsequently segmented without regard to their content. As a result, the use of the CED causes separate data, voice, video, etc. networks to converge into a single network thus realizing the benefits of building, operating and maintaining a single network.

Paragraph beginning on page 16, line 22

First, a CED is installed adjacent to each SDH ADM in the CO/POP (step 470). It is preferable that each CED have IP switching capabilities as well. An Ethernet fabric is established by connecting the CEDs to each other using Gigabit Ethernet connections between the CEDs (step 472). The connections [[as]] are made using an additional fiber in parallel to the existing SDH connection or additional wavelength on the same fiber. Note that the connections can be made either between CEDs or between 3rd party routers in the local IP cloud.

Paragraph beginning on page 17, line 1

The integrity of the E1/T1 lines over the Ethernet network are then verified (step 480). Traffic is then moved from E1/T1 over SDH to E1/T1 over Ethernet network (step 482). The SDH equipment that is no longer [[is]] in use is either removed or ~~used~~ utilized as a redundant system (step 484).

Paragraph beginning on page 17, line 5

Note that the procedure described above pertains to the migration of voice networks. In the case [[of]] where additional data services are provided on the same IP/Ethernet network, the following is noted: (1) all equipment in the network preferably is able to receive QoS enforcement commands and to change prioritization of packets in light of Network Management System (NMS) policies; (2) security is preferably maintained throughout the network using Virtual Private Networks (VPNs) in the network and firewalls at the customer premise; and (3) provision for billing, accounting and provisioning of data services.

Paragraph beginning on page 19, line 11

Connection to higher levels of the hierarchy is through a Class-4 switch (not shown) connected to one end of a Class-5 switch via high rate TDM facilities (e.g., E3, T3, etc.). The Class-5 switch is connected to a CED via one or more TDM facilities such as N x E1 lines. The CED, in turn, is ~~attached~~ connected to the IP/Ethernet network 166 via an Ethernet connection having a sufficient data rate.

Paragraph beginning on page 19, line 16

The example network illustrated here also shows the integration of enterprise, SOHO and home generated traffic into the same single IP/Ethernet network via a CED 177 placed in the CO or POP 181. In the enterprise environment 171, a PBX 176 is connected to an IP based NTU 174. A LAN 180 is connected via a router 178 to the NTU through a Fast Ethernet connection. The IP based NTU is connected directly to the CED 177 in the CO/POP 181 via a high ~~rate~~ speed Ethernet connection such as Gigabit Ethernet.

Paragraph beginning on page 19, line 31

A key feature of such a network 160, is that the telecommunications company needs only to operate a single IP network (i.e. IP/Ethernet network 166). This network is operative to support legacy voice and data services using currently used configurations ~~while~~. In addition, the network enables new methods of connectivity such as direct Ethernet connectivity to business enterprises.

Paragraph beginning on page 21, line 1

The manner of storing the TDM data can be either (1) according to the particular TDM port number or (2) according to time duration. In the former case, [[a]] data from a plurality of TDM ports ~~are~~ is packaged into a single Ethernet frame. In the latter case, a plurality of TDM frames from a single port are packaged into a single Ethernet frame. In addition, a combination of (1) and (2) above can be ~~done~~ implemented, i.e. several ports with several durations.

Paragraph beginning on page 22, line 2

A block diagram illustrating the hardware architecture of the hardware circuit emulation device of the present invention is shown in Figure 9. The Circuit Emulation Device[[ ]], generally referenced 330, is adapted to provide a bi-directional data path between a plurality of TDM bit streams and at least one Ethernet interface connected to an Ethernet network. At the core of the CED is a encapsulation/segmentation processor 364 and a CPU 352. The processor 364 comprises a PCM/TDM interface 370, host interface 368, memory interface 366 and a PCI controller 372 to a PCI bus 362. The CPU 352 comprises a PCI controller 360 to a PCI bus 362 and interfaces to a configuration serial EEPROM 354, address monitor 356 and a local bus 350.

Paragraph beginning on page 22, line 26

The digital-X ports 382 can be adapted to be configurable as either E1, T1, E3, T3, OC-3 or OC-12 ports. Each PHY block constituting a port comprises a framer (e.g., D4, ESF), line interface unit (LIU) and magnetic components (not shown). The PHY also performs the required signaling functions robbed bit, Clear Channel Support (CCS) or transparent. In addition, the PHY circuitry comprises a protection component such as a CSU/DSU which is needed when the line is may be exposed to lightning. Note that this is usually the case when the switching product is not co-located with the CED in the same building. Note also that the PHY circuit may be adapted to interface to other types of lines as well such as unbalanced E1 ~~lions~~ lines, ISDN BRI or PRI, etc.

Paragraph beginning on page 23, line 3

Note that the CED preferably is constructed to support TDM streams that typically comprise carrier voice channels. In this case, the CED is adapted to support [[the]] low delay requirements of voice while supporting unreliable transport of the data. Since most carriers also support video and data, however, a management task in the CED is adapted to configure the system for different category requirements.

Paragraph beginning on page 24, line 9

~~Through the~~ The encapsulation/segmentation processor 364 is adapted to receive commands from the CPU via the PCI interface or from the host 374 via the host interface 368. In addition, the CPU can read various status information generated by the processor. The parameters include:

Paragraph beginning on page 25, line 9

The encapsulation processor utilizes [[uses]] these parameters to pack together the relevant P_frames and encapsulate them with the appropriate headers. The encapsulated frame is forwarded to the Ethernet MAC for FCS calculation and PCS functions, and subsequently forwarded to the IP/Ethernet network.

Paragraph beginning on page 26, line 14

The invention has application with many different types of protocols, including[[ ]], but not limited to, RTP, UDP, TCP, IP and Ethernet. It is appreciated that other protocols can also be used. Brief descriptions of the header formats for RTP, UDP, TCP, IP and Ethernet are presented hereinbelow. A more detailed description of these well known protocols can be found in their respective standards.

Paragraph beginning on page 30, line 15

A diagram illustrating the control frame format of the present invention is shown in Figure 17. The control frame, generally referenced 280, comprises a 14 byte Ethernet header 282, 20 byte IP header 284, 20 [[but]] byte TCP header 286, 20 byte application header 288 and N x 64 bytes of data 290.

Paragraph beginning on page 31, line 20

In the ~~other~~ opposite direction, Ethernet frames are received by the MAC layer and stored in the egress buffer (block 324). The received Ethernet frames are then processed. The headers are removed and the packet contents are segmented into TDM data frames (block 326). The TDM frames are then buffered in the egress out buffer (block 328). The TDM CBR streams are re-generated, re-synchronized and forwarded to the TDM PHY blocks (block 329).

Paragraph beginning on page 32, line 1

A block diagram illustrating the software architecture of the hardware circuit emulation device of the present invention is shown in Figure 19. The software processes, generally referenced 430, are performed by a plurality of software tasks that are executed by the CPU. The tasks include [[a]] TDM memory task 438, RTP protocol processing task 440, RTCP protocol processing task 442,

timing task 444, management task 448, UDP/IP protocol processing task 450, Fast Ethernet task 452, Gigabit Ethernet task 454, I^2C task 456, CPU core 458, JTAG task 460 and system status task 462. In addition, the software also comprises [[a]] low level hardware drivers 436, suitable operating system such as VxWorks 434 and the application layer 432.